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ABSTRACT

Presented is a guide for teaching activities produced as a result of a Learning in Science Project investigation which showed that children often have quite different meanings for the words "animal," "plant," and "living" than do scientists. Included are: (1) focus of instruction at different educational levels; (2) a suggested teaching program; (3) survey instruments; (4) an outline to categorizing activities; and (5) guidelines for teaching about reasons (emphasizing the scientific reasons used in the process of categorization). Major instructional foci include: increasing children's awareness of living things, animals, and plants by providing opportunities to observe these different phenomena (Level 1); developing classification skills, and classifying living things, plants, and animals as scientists do (Levels 2-3); contrasting scientists' meanings for these words with the metaphoric and everyday use of the words (Level 4); and considering reasons scientists use for classifying things into living, non-living, animal, and plant (Level 5). The survey instruments are provided for teachers to find out what students mean by the words "animal," "plant," and "living thing" before and after a teaching/learning episode. (JN)

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TEACHING ABOUT ANIMAL, PLANT, LIVING PART I

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WORKING PAPER No. 31

TEACHING ABOUT ANIMAL, PLANT, LIVING

Suggested Teaching Activities

Edited by Beverley Bell

November 1981

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THE FOCUS OF THE TEACHING AT DIFFERENT LEVELS

INTRODUCTION

The following teaching activities have been produced as a result of a Learning in Science Project investigation which showed that children often have quite different meanings for the words animal, plant and living than do scientists. If you are to use the following activities it is essential that you first read the associated Working Paper:

Animal, Plant and Living - notes for teachers,
LISP Working Paper No. 30.

The rationale behind the following activities can be found in the Working Paper:

Toward Solutions: the work of the Biology Action-Research Group,
LISP Working Paper No. 29.

Level 1 (J1-J3)

increasing children's awareness of the things we call living things, animals, and plants by getting them to observe these different kinds of things.

Level 2-3 (Std 2 - Std 4)

(a) developing the skill of categorising,

(b) categorising things into the groups of living, non-living, dead, and animal and plant, as would a scientist.

Level 4 (Form I-II)

(a) and (b) as for Level 2-3

(c) contrasting the scientists' meanings for these words with the metaphoric and everyday use of the words.

Level 5 (Form III-IV)

(a),(b),(c) as for Level 4

(d) the reasons scientist use for categorising things into living, non-living, animal and plant.

SUGGESTED TEACHING PROGRAMME

LEVEL 1 (J1-J3)

The focus of teaching about animal, plant, and living at this level is on increasing children's awareness of what we call living things, animals and plants by getting them to observe these different kinds of things.

A Suggested Procedure at Level 1

A language approach is best suited to this age level. Throughout the day the words 'living', 'animal' or 'plant' are key words in all lessons - reading, story telling, art, story writing. Trips around the school grounds can be used to encourage children to look for living things (animals and plants). In P.E. exercise can be based on growing like plants, moving like different animals (e.g. carbs, fish, birds). Music activities can focus on songs about different animals and plants (see Activity 5).

Note 1:

The above activities provide for a focus on, and development of, ideas about living versus non-living. Similar aims and activities, on a different occasion, may focus on and develop ideas about animals and plants.

Note 2:

We suggest that these initial lessons on living (as well as lessons on animal and plant) at Level 1 be of a general nature. For example we do not suggest that you begin to teach the sub-groups of the set of animals too soon. Children with incorrect preparation of animals are likely to see insects for example, as a completely separate group and not animals at all. This doesn't mean you can't talk about insects but it does mean that any such discussion should first be couched in terms of whether insects are animals or not.

Note 3:

Children's ideas about what is, or is not, an animal may often be much closer to the scientific idea at Level 1 than at higher levels. However, very few of these younger children consider a person to be an animal.

SUGGESTED TEACHING PROGRAMME

LEVELS 2-3 (Std 2 - Std 4)

The focus of teaching about animal, plant and living is on;

(a) developing the skill of categorisation,

(b) categorising things into groups of living/non-living/dead and animal/plant as would a scientist.

A Suggested Procedure at Levels 2-3

1. Administer the appropriate survey(s) to your class to find out what they consider to be living, animal, or plant. The outcomes of the survey(s) can be used to select appropriate activities. See instructions for administering the survey(s) on Page 6.

2. Preliminary Activity

   To create interest - Activity 1.1.

3. Core Activities

   Activity 1.3(a),(b),(c).

4. Reinforcement Activities

   Select from Activities 2, 3, 4, 5, 6.

SUGGESTED TEACHING PROGRAMME

LEVEL 4 (Form I-II)

At this level it may be still necessary to develop and practise the skill of categorising things into groups of living, non-living, dead, and animal and plant as would a scientist. It is also important to contrast the scientific meanings of the words 'living', 'animal' and 'plant' with the children's meanings. However there is no need to emphasize reasons until Level 5 (Form III and IV). Rather the emphasis should be on the scientists' labels for a wide variety of examples. Subsequent lessons on any aspect of living things using the available curriculum materials from Wellington, should provide continued opportunity for teachers to clarify that it is the scientists' labels that are being used in these lessons. For example, if we talk about insects we need to remind children that they are also animals.

Suggested Procedure at Level 4

1. Administer the appropriate survey(s) to your class to find out what they consider to be living, animal or plant. The outcomes of the survey(s) can be used to select appropriate activities. See instructions for administering the survey on Page 6.

2. Core Activities

   Select from Activities 1.1 or 1.2; do all of 1.3(a),(b),(c).

3. Reinforcement Activities

   Select from Activities 2, 3, 4, 5, 6, 7, 8, 11.

4. Extension Activities to challenge the more able students

   Select from Activities 9, 10, 12, 13.

SUGGESTED TEACHING PROGRAMME

LEVEL 5 (Forms III and IV)

Again, it may be necessary to revise and practise the skill of categorising things into groups of living, non-living, and animal and plant as would a scientist. The emphasis will be on the contrasting tne scientific meanings with the everyday and metaphoric meanings of the words 'living, 'animal' and 'plant', and on the reasons scientists use for categorising something as an animal, plant or living.

Suggested Procedure at Level 5

1. Administer the appropriate survey(s) to your class to find out what they consider to be living, animal or plant. The outcomes of the survey(s) can be used to select appropriate activities. See the instructions for administering the surveys on Page 6.

2. Core Activities

   Select from Activities 1.1 or 1.2; do all of 1.3(a),(b),(c).

3. Reinforcement Activities

   Select from Activities 2, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17.

4. Extension Activities to challenge the more able students

   Select from Activities 15, 18.

THE SURVEYS

These surveys may be used to find out what your students mean by the words 'animal', 'plant' and 'living' before you begin a teaching and learning episode. The results will enable you to select appropriate teaching activities so you can begin from where the students are.

Parallel surveys may be used after the teaching and learning episode so you can evaluate the progress made.

INSTRUCTIONS FOR ADMINISTERING THE SURVEYS

For each word or concept there are two surveys. The A survey for each word may be given before the teaching and learning episode, and the B survey after.

Surveys 1a and 1b are about the word animal.
Surveys 2a and 2b are about the word plant,
Surveys 3a and 3b are about the word living.

There are two sheets for each survey - a master sheet with pictures, and an answer sheet.

To use the master sheets provided (6 altogether), two options are:

1. To make an overhead transparency of the master.
2. Copy the master (photocopy, banda, etc) and have a copy for each student.

Give only one survey per day (either 1a, 2a, or 3a; either 1b, 2b or 3b)

1. Hand out the answer sheets, one to each student. Check that the number, e.g. 1a, matches the number on the master sheet (the picture sheet).
2. With the master sheet on the overhead projector or with copies handed out explain what pupils are required to do and how they indicate their answer on the answer sheets.
3. The survey normally takes about 5-10 minutes to complete.
4. Collect in the answer sheets without going over the answers.

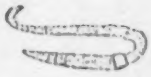
For the younger children you may prefer to:

Go through the survey with individual children. Point to the picture on the master sheet and ask if it is an animal (or plant or living). The teacher then places a tick in the appropriate square on the answer sheet.

Go through the survey as a whole class but the students indicate their choice of answer by a show of hands. The teacher counts the number of hands for a 'yes' answer and for a 'no' answer, and records this on one answer sheet.

Is it an animal?

1.

2. 

3.

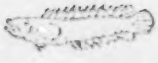
4.

5.

6.

7.

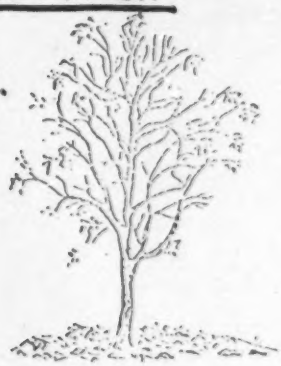
8.

9. 

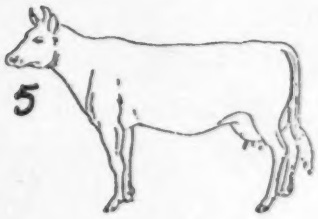
10.

Is it an animal?

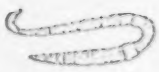
1.

2. 

3


5

4
7

6 

8

9

10

ANSWER SHEET

IS IT AN ANIMAL?

1a

Put a tick (✓) in one of the squares

1.	Is a person an animal ?	Yes ☐	No ☐
2.	Is a worm an animal ?	Yes ☐	No ☐
3.	Is a moth an animal ?	Yes ☐	No ☐
4.	Is a spider an animal?	Yes ☐	No ☐
5.	Is a seagull an animal?	Yes ☐	No ☐
6.	Is a fire an animal?	Yes ☐	No ☐
7.	Is a pine tree an animal?	Yes ☐	No ☐
8.	Is a dolphin an animal?	Yes ☐	No ☐
9.	Is a fish an animal?	Yes ☐	No ☐
10.	Is a horse an animal?	Yes ☐	No ☐

IS IT AN ANIMAL?

1b.

Put a tick (✓) in one of the squares.

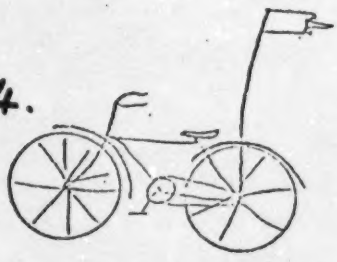
1.	Is a butterfly an animal?	Yes ☐	No ☐
2.	Is a tree an animal?	Yes ☐	No ☐
3.	Is a fire an animal?	Yes ☐	No ☐
4.	Is a fish an animal?	Yes ☐	No ☐
5.	Is a cow an animal?	Yes ☐	No ☐
6.	Is a worm an animal?	Yes ☐	No ☐
7.	Is a whale an animal?	Yes ☐	No ☐
8.	Is a sparrow an animal?	Yes ☐	No ☐
9.	Is a person an animal?	Yes ☐	No ☐
10.	Is a spider an animal?	Yes ☐	No ☐

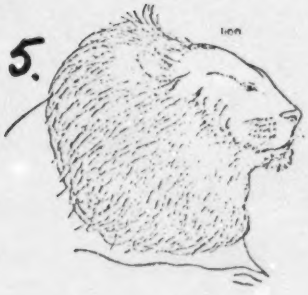
Is it a plant?

1.

2.

3.

4. 

5. 

6.

7.

8.

9.

10.

2b

Is it a plant?

1.

2.

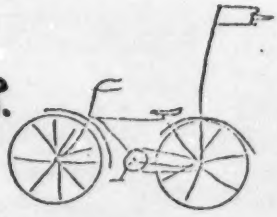
3.

4.

5.

6.

7.

8. 

9.

10.

ANSWER SHEET

IS IT A PLANT?

2a

Put a tick (✓) in one of the squares.

1.	Is seaweed a plant?	Yes ☐	No ☐
2.	Is a carrot a plant?	Yes ☐	No ☐
3.	Is a lettuce a plant?	Yes ☐	No ☐
4.	Is a bike a plant?	Yes ☐	No ☐
5.	Is a lion a plant?	Yes ☐	No ☐
6.	Is a fern a plant?	Yes ☐	No ☐
7.	Is grass a plant?	Yes ☐	No ☐
8.	Is a poppy a plant?	Yes ☐	No ☐
9.	Is a thistle a plant?	Yes ☐	No ☐
10.	Is an oak tree a plant?	Yes ☐	No ☐

IS IT A PLANT?

2b

Put a tick (✓) in one of the squares.

1.	Is a dandelion a plant?	Yes ☐	No ☐
2.	Is a cabbage a plant?	Yes ☐	No ☐
3.	Is a parsnip a plant?	Yes ☐	No ☐
4.	Is a thistle a plant?	Yes ☐	No ☐
5.	Is a fern a plant?	Yes ☐	No ☐
6.	Is a seaweed a plant?	Yes ☐	No ☐
7.	Is a pine tree a plant?	Yes ☐	No ☐
8.	Is a bike a plant?	Yes ☐	No ☐
9.	Is a tiger a plant?	Yes ☐	No ☐
10.	Is a daisy a plant?	Yes ☐	No ☐

Is It living?

1.

2.

3.

4.

5.

6.

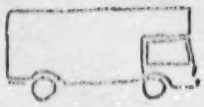
7.

8.

9.

10.

Is it living?

1. 

2.

3.

4.

5.

6.

7.

8.

9.

10.

ANSWER SHEET

IS IT LIVING? 3a.

Put a tick (✓) in one of the squares.

1.	Is a river living?	Yes ☐	No ☐
2.	Is a bird living?	Yes ☐	No ☐
3.	Is a person living?	Yes ☐	No ☐
4.	Is a car living?	Yes ☐	No ☐
5.	Is a fire living?	Yes ☐	No ☐
6.	Is a cloud living?	Yes ☐	No ☐
7.	Is a cat living?	Yes ☐	No ☐
8.	Is the sun living?	Yes ☐	No ☐
9.	Is grass living?	Yes ☐	No ☐
10.	Is a butterfly living?	Yes ☐	No ☐

IS IT LIVING? 3b.

Put a tick (✓) in one of the squares.

1.	Is a truck living?	Yes ☐	No ☐
2.	Is the sun living?	Yes ☐	No ☐
3.	Is a cloud living?	Yes ☐	No ☐
4.	Is a seagull living?	Yes ☐	No ☐
5.	Is a dandelion living?	Yes ☐	No ☐
6.	Is a person living?	Yes ☐	No ☐
7.	Is a river living?	Yes ☐	No ☐
8.	Is a dog living?	Yes ☐	No ☐
9.	Is a moth living?	Yes ☐	No ☐
10.	Is a fire living?	Yes ☐	No ☐

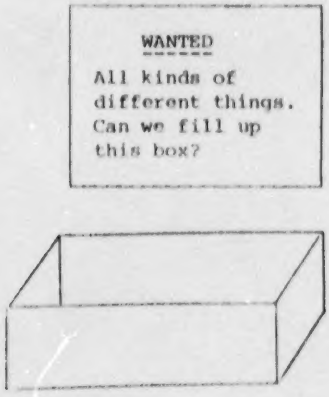
OUTLINE TO CATEGORIZING ACTIVITIES (Activities 1-15)

1. Core Categorizing Activities

The following activities give practice in categorising things into sets (large groups) and subsets (smaller, inclusive groups) e.g. living things (the set) and animals, plants (subsets).

Prior to the lesson collect a large collection of illustrations of examples of living things (animals and plant), things that have never been alive (e.g. a stone), and things that were once alive, (e.g. leather).

1.1 The examples may be objects brought by the children. Using a poster and cardboard carton, collect items over a week and build up interest in the 'mystery box'. The teacher may need to add to it to ensure there is the full range of objects.



1.2 Use the sheet (see Page 17) with 25 different objects drawn on it. The banda sheet can be cut up with scissors by the pupils and the individual pieces can be sorted into groups.

rock

grass

snake

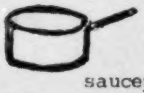
candle

spider

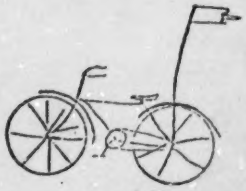
earthworm

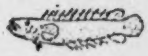
poppy

horse


saucepan

lettuce


bike



dog

car

cloud

person

river

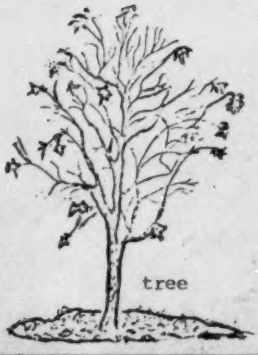
log of wood

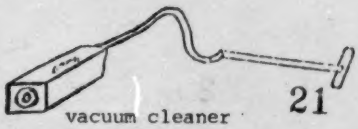
snail

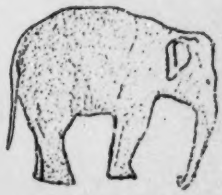
fern

cat

fire


tree


vacuum cleaner


elephant

1.3 For Categorising Activities Using 1.1 or 1.2

When the objects are to be sorted, the pupils might work as a class or in small groups.

(a) If objects have been collected by the pupils they can be sorted by the whole class. Clear a large area of floor space and use Phys.Ed. hoops or a large sheet of newsprint with coloured circles to clearly demarcate each group.

With the banda sheets, the pictures may be sorted by small (2-4) groups. The advantage of a small group is to provide the opportunity for free discussion and disagreement as to how best to group the pictures. This usually communicates clearly to pupils that different people group things in different ways.

(b) The sorting may be approached in two ways:

i) Sorting the objects/pictures into any groups, e.g. big, small, colour, size, land, sea, dead, alive. The teacher may need to introduce the groupings of living/non-living and animal/plant if the pupils do not.

ii) The sorting may be directed, e.g. sort the objects/pictures into
animals and non-animals, or
plant and non-plant, or
living and non-living, (but not sub-groups).

(c) Pupils may need to be shown how a scientist would group the objects/pictures into living/non-living; animal/non-animal; and plant/non-plant.

The main emphasis of the sorting exercise is to

(a) present a problem to the students: that there are different ways to group things,

(b) communicate how a scientist would group them,

(c) give students the opportunity to actively group things using many examples and non-examples in their everyday grouping and in the scientific grouping.

2. GAME: Animal/Plant/or Never Been Alive

This is a modified version of "animal, mineral, vegetable", and "40 questions". One person says "I'm thinking of something. What am I?" Others may ask questions but only "Yes" or "No" answers are given. Limit questions to 10-15 if need be before stating what it is.

3. ACTIVITY CARDS

On cards (you might cover these with plastic for protection) write a series of activities associated with animals, plants, and living things. These can be kept in a box for students to select from. Examples might be:

Animals
Collect loose hair from different animals and make a chart.

Animals
Make a list of different kinds of animals around the school.

4. SORTING CARDS

In a box, provide pictures from magazines, calendars, etc., on cards for practising sorting into groups when other work is finished for the day.

5. MUSIC ACTIVITIES With Living Things and Dead Things

(a) Class Song

1) Select a well known class song.

2) Children work as a class or in groups and make up versus reinforcing the basic concepts learnt.

3) The song can be written into a booklet and illustrated.

(b) Picture Interpretation

1) Teacher has a selection of big posters available of different animals and plants.

2) Children work as a class or in groups with the chosen picture.

3) Children use body noises and percussion instruments to describe the pictures.

4) Music may be taped and class guess which picture it belongs to.

(c) Butterfly Journey over the Waste Area

1) Discuss what music there is to be.

2) Discuss the different groups of living things within the waste area, e.g.

animals - spider, cricket, lizard, pukeko, etc.

plants - pinetree, rushes, grass, etc.

dead animals - feather, bone, etc.

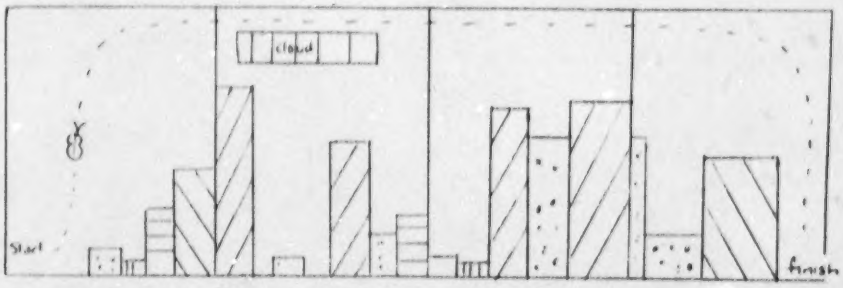
dead plants - straw, pinecones, etc.

always dead - stone, wire, etc.

3) Allow time to experiment with suitable body/percussion noises for objects (clouds wouldn't want heavy drum beats).

4) Decide which children will make each noise.

5) Teacher points slowly along the dotted line.



and children make the appropriate noises when the teacher moves over their set in the picture.

6. Children enjoy making their own music scores.

7. Play and record

(a) Animal Journey

This is a musical activity where children sing animal names, e.g. 'crocodile', to represent the sounds on a train journey, e.g. the sound of a train going over a bridge - 'croc-o-dile-croc-o-dile'.

For various aspects of the journey the following word sound could be used.

The starting whistle	"High pitched 'Spi-der'"
Slowly starting off	"Human"
Gathering speed	"Black-bird"
Faster	"Mammals have babies"
Faster still	"Mammals eat and drink"
Steady Speed	"Animals move around"
Going over a bridge	"Croc-o-dile"
Whistle again	"Spi-der"
Tunnel noises	"Caterpillars"
Down hill	"Galloping horse" (staccato)
Bells at the crossing	"Birds are flying, birds are flying"
Train crossing road	"Fighting tigers"
Whistle again	"Spi-der"
Slowing	"Centipede"
Pulling into station	"Human"
Stopping	"Fishing"
Stopped	"Fish ... sh ... sh"

For each part of the journey say each word four times except "spider" (whistle).

Keep a brisk pace.

Journeys can be made up for plants, always dead things, animal dead, plant dead, etc.

6. CARD GAMES

These games require children to decide whether a living thing is an animal or a plant. It also conveys to them what a scientist considers to be an animal and a plant.

The games are:

(a) Snap (see p.24)
(b) Memory (see p.24)
(c) Animal or Plant - Which Am I? - a board game. (see p.25)
(d) Up the Plants and Down the Animals - a board game. (see p.26)

7-10. KEYWORD CROSSWORDS (p.47-50)

Keywords crosswords can be used to confront the differences between children's ideas and the scientists' ideas. The crosswords on p.47-48 are for Level 4 pupils, those on p.49-50 are for Level 5 pupils.

11. WORD PUZZLES (p.51, 52)

These provide an additional reinforcement activity.

12-13. CLASSIFICATION (p.53-56)

This activity is to help pupils see the relationship between sets and subsets of animals and plants.

14. SUMMARY SHEETS (p.57, 58)

This worksheet provides (Level 5) pupils with the opportunity to summarize the key ideas.

15. HOMEWORK TASK: LIVING (p.63, 64)

A reinforcement homework task.

TEACHING ABOUT REASONS (Activities 16-18)

Activities to provide further practice in categorisation as well as focussing on the scientific reasons used in the process of categorisation. Acceptable scientific reasons to use at this level are given in Working Paper No. 30 p.11,12.

The activities may be used in the following ways to promote the understanding of the scientific reasons.

1. Focus on the role of reasons or characteristics as criteria to decide if something is to be categorised in one group or another. Activity 16: Detective puzzle, p.61.

2a. Elicit from student the reasons they might use. An example of questions that might be used to do this is "What tells you that?"

b. Highlight the inadequacy of student reasons. The following transcript of a lesson illustrates this.

I. "Is a cow an animal?"
S. "Yes."
I. "What tells you that?"
S. "It's got legs, is furry and lives on land."
I. "Is a bird an animal?"
S. "No."
I. "But like a cow, it has legs, is furry and lives on land."
S. "But animals don't fly."
I. "A scientist calls a bat an animal. If flies. It has legs, and fur."

Activities 17 and 18 are useful discussion starters.

c. Explicitly state the scientific reasons and give practice in categorising using these reasons as in activities.

N.B. As described in Working Paper No.30, p.11,12, it is adequate at this level to use the reason, "Living things are the animals and plants", or rephrased appropriately:

"If it's an animal, it is a living thing."
"If it's a plant, it is a living thing."
"If it's not an animal or a plant, it's not a living thing."

"Living things are the animals and plants. A spider (for example) is a living thing. It is not a plant. It must be an animal."
or "A cabbage is a living thing. It is not an animal. It must be a plant."

Use the MRS GREN with caution. See Working Paper No.30, pages 13, 15. Children use such characteristics as movement, growth, to categorise some non-living things, e.g. fire, as living.